Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
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Modernizing the E-rate Program for Schools and Libraries	)	WC Docket No. 13-184
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COMMENTS OF NEW AMERICA FOUNDATION'S OPEN TECHNOLOGY INSTITUTE AND EDUCATION POLICY PROGRAM

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Executive Summary

The New America Foundation's Open Technology Institute and Education Policy Program (Commenters) offer the following recommendations in support of the Commission's goal to better address the broadband capacity needs of schools and libraries. Schools and libraries face enormous challenges in ensuring that they are adequately connected to broadband services that enable 21st century learning. Now is the time for the Commission to revisit the E-rate program and evaluate the best structure and funding amount to better equip schools and libraries to overcome these challenges. For the Commission's consideration in its evaluation of the program, we make the following recommendations.

The E-rate Fund should encourage significantly more community investment in fiber infrastructure. Commenters believe that this investment could be increased by eliminating the existing E-rate cap and modifying the Fund's budget after careful, thorough analysis of school and library connectivity needs; facilitating increased investment in owned fiber, particularly community-owned fiber; aligning support for dark fiber with that of lit fiber; implementing specific, incremental but escalating performance standards; and ensuring that schools and

libraries have the ability to not only connect their premises, but also to spread that connectivity adequately within their facilities with sufficient hardware.

In addition, the E-rate Fund should facilitate greater community connectivity where feasible. To achieve increased community connectivity, the Commission should provide flexibility for schools and libraries to maintain open Wi-Fi hotspots during non-school and non-business hours, and it should also provide flexibility for schools and libraries to maintain open Wi-Fi hotspots during school or business hours, when they can demonstrate that doing so will not disrupt service to school students or library patrons.

The Commission should also use smart data collection practices to improve the efficacy of the Fund and promote greater transparency about broadband availability and quality for schools and libraries. Improving data collection practices should include ensuring that required Form 471 filings collect useful data; rebalancing of reporting burdens on schools and libraries compared to those imposed on carriers; examining available technology to gather data automatically at the premise level; annually releasing complete E-rate data in machine-readable format, building upon the data the FCC has made available in the past; and optimizing FCC data collection and reporting requirements to correspond with other robust data sources.

Finally, the Commission should distribute E-rate funds in a way that promotes fair and equitable service and speed to schools and libraries of various sizes and in various locations. To do so, the Commission must critically consider the impact per-pupil funding would have on achieving broadband infrastructure parity, as well as equitable service and speed; collect robust data while explicitly prohibiting proposals that tie funding to specific education outcomes; and investigate ways to improve parity in primary and secondary education nationwide.

I. Introduction

Sustaining and upgrading the Internet infrastructure that supports schools and libraries is critical to strengthening our country's education system. While we recognize that broadband boosts alone will not automatically create better schools or library services, updating the E-rate program will ensure that all students and families have access to educational resources that enable them to develop skills for 21st century careers and citizenship. Without strong, equitable Internet infrastructure in our schools and libraries, the United States will have no platform for continuing our push for equity, excellence and innovation in our educational system.

Commenters, New America Foundation's Open Technology Institute[1] and Education Policy Program[2] recommend modification of the Commission's rules to encourage significantly more investment in fiber infrastructure, particularly by communities themselves; broaden community access to E-rate supported Internet services; improve data collection practices to

[1] The Open Technology Institute formulates policy and regulatory reforms to support open architectures and open source innovations and facilitates the development and implementation of open technologies and communications networks. OTI promotes affordable, universal, and ubiquitous communications networks through partnerships with communities, researchers, industry, and public interest groups and is committed to maximizing the potentials of innovative open technologies by studying their social and economic impacts – particularly for poor, rural, and other underserved constituencies. OTI provides in-depth, objective research, analysis, and findings for policy decision-makers and the general public.

[2] The Education Policy Program uses original research and policy analysis to solve the nation's critical education problems, serving as a trusted source of objective analysis and innovative ideas for policymakers, educators, and the public at large. We combine a steadfast concern for low-income and historically disadvantaged people with a belief that better information about education can vastly improve both the policies that govern educational institutions and the quality of learning itself. Our work encompasses the full range of educational opportunities, from early learning to primary and secondary education, college, and the workforce. We are deeply engaged in ongoing developments in educational technology at all levels of child and adult development. We believe new organizational models have potential to achieve breakthrough levels of performance on behalf of students. And we believe that all providers of education must be held constructively accountable for the quality of their work

increase transparency and efficacy; and distribute E-rate funds in a way that promotes fair and equitable service and speeds to for students and patrons of all schools and libraries.

II. The E-rate Fund should encourage significantly more community investment in fiber infrastructure.

As the Commission correctly notes, "[i]ncreasingly, schools and libraries require high-capacity broadband connections to take advantage of digital learning technologies that hold the promise of substantially improving educational experience and expanding opportunity for students, teachers, parents and whole communities."[3] These capacity needs have steadily increased, and will continue to increase at significant rates. In recognition of the growing broadband needs of schools and libraries, President Barack Obama, Federal Communications Commissioner Jessica Rosenworcel, and Senator John D. Rockefeller IV have all proposed implementing aggressive capacity targets over the next 10 years. As Commissioner Rosenworcel noted in June, E-rate's "problem now is not connectivity, it's capacity."[4]

Recognition of these needs is not new. The National Broadband Plan previously noted that "[s]chools, libraries and health care facilities must all have the connectivity they need to

[3] *Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Notice of Proposed Rulemaking, FCC 13-100, ¶ 1 (2013) (E-rate NPRM).
[4] Cost Could Complicate School Broadband Plan, Politico Pro, June 7, 2013, http://www.politico.com/story/2013/06/cost-could-complicate-school-broadband-plan-92375.html. *See also* High-Speed Broadband in Every Classroom, Cisco White Paper, p. 23 (Sept. 2013) (Cisco White Paper): "During first-generation deployments of wireless technology in schools, many focused on coverage. If a wireless access point signal could be reached from a classroom, the classroom was considered to be sufficiently covered." However, "students were obtaining only a small fraction of the bandwidth they required, and they were spending the majority of the class time waiting for web pages to load. This is because the bottleneck is in the classroom wireless throughput, not coverage."

achieve their purposes. This connectivity can unleash innovation that improves the way we learn, stay healthy and interact with government."[5]

To meet these goals, the Commission must do more than set targets for the next few years. It must prioritize significant investments in future-proof technologies. To do so, it should align support for dark fiber with that of lit fiber; it must facilitate investment in fiber, particularly community-owned fiber; it must implement specific performance standards to ensure that future service contracts are made for fiber, rather than outdated service offerings; and it should ensure that schools and libraries have the ability to not only connect their premises, but also to spread that connectivity adequately within their facilities.

A. The Commission should ensure that the E-rate program is adequately funded, broaden support for dark and lit fiber deployment while supporting community investment in fiber deployments to schools and libraries, and continue to assess how to improve school and library access to internal hardware to efficiently distribute connectivity within institutions.

EducationSuperHighway notes that only 23 percent of schools are sufficiently wired to meet today's broadband demands and that fewer than 10 percent are wired with the broadband that will be needed in 2017.[6] This gap will be exacerbated the longer we wait to increase support for next-generation connectivity for school and libraries. The Leading Education by Advancing Digital (LEAD) Commission echoes this thinking in its recommendations, which calls for "focus on Internet infrastructure,"[7] particularly investments in fiber infrastructure. It urges the Federal Communications Commission to "enable districts to invest in fiber connections to their schools,"

[5] Federal Communications Commission, Connecting America: The National Broadband Plan, (National Broadband Plan),Goal #4, available at http://www.broadband.gov/download.
[6] EducationSuperHighway, *Internet Infrastructure for America's K-12 Students* (2012).
[7] Statement of James Coulter, Hearing on E-rate 2.0: Connecting Every Child To the Transformative Power of Technology, U.S. Senate Committee on Commerce, Science and Transportation (July 17, 2013) (Coulter Testimony).

and recognizes that "E-rate currently supports operating expenditures but does not incentivize long-term investment in fiber."[8] To address this lack of incentivization, the LEAD Commission encourages the Federal Communications Commission to empower schools to make the same kind of decisions that businesses regularly make to invest in upfront capital while lowering ongoing operating expenses.[9] In sum, "curriculum development will lag and private sector investment will languish if the infrastructure remains inadequate. It will be simply less attractive for educators and businesspeople to drive educational technology innovations if only 10 to 20 percent of schools are wired to use them."[10]

The Commission asks, "[a]re fiber connections generally the most cost effective and future-proof ways to deliver high-capacity broadband to community anchor institutions like schools and libraries?"[11] As Commenters and others have illustrated: fiber is certainly the most future-proof technology available when it comes to high-capacity broadband. Indeed, it is not merely the case that fiber *currently* offers greater capacity than copper; it also has a much stronger ability to increase in capacity to meet future needs. As the Institute for Local Self-Reliance (ILSR) notes, "fiber strands last for decades and can be increased without having to lay new fiber."[12]

In addition, when owned by schools, libraries, or other entities in the community, fiber is a cost-effective option in the long term in most situations, even if the upfront investment costs

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[8] Coulter Testimony.
[9] Coulter Testimony.
[10] Coulter Testimony.
[11] E-rate NPRM ¶ 67.
[12] Fact Sheet: Broadband 101, Institute for Local Self-Reliance, http://www.ilsr.org/wp-content/uploads/2013/03/fact-sheet-bb-1011.pdf (ILSR Fact Sheet). *See also* Cisco White Paper p. 29: "Fiber provides significant connectivity and flexibility, so schools should pursue opportunities to use fiber when available for connections between buildings, to allow for practically unlimited bandwidth as needs increase over time."

seem significant. By allowing smart one-time investments, the Commission will lower the ongoing cost of broadband services. Martin County, Florida, provides an example of a community that realized significant savings by building its own fiber network rather than continuing to lease lines from Comcast. A report from ILSR explains that the school district there saved "over $500,000 in the first six years by partnering with the County to build a publicly owned network rather than continuing to lease connections from Comcast."[13] The Martin County example illustrates that "[g]enerally, the markup on buying capacity from a cable or telephone company is far higher than what it would cost an entity like Martin County to do over dark fiber."[14] And while these savings are significant, they are further amplified by emerging, unanticipated additional uses of the network. For instance, "[t]hree public safety towers are now on the network, saving $73,000 in annual connectivity and surveillance costs."[15] Because most school and library budgets are part of other local or state budgets, these types of cost savings can have a direct impact on those institutions.

Finally, as needs increase, costs for maintaining fiber networks may also decrease. More demand may mitigate costs for the most expensive part of a fiber network—actually laying the conduit and cable—and maintaining a fiber network is generally less costly than maintaining other networks. "The high cost of new fiber networks is mostly the labor to put the cables in place on poles or in conduit underground; operating costs are lower than for cable, DSL, or wireless networks."[16] Verizon itself estimates that the "difference in maintenance costs between a copper line and a fiber line, expressed in a Net Present Value of all future gains, exceeds $200

[13] Florida Fiber: Martin County Saves Big with Gigabit Network, Institute for Local Self-Reliance, http://www.ilsr.org/wp-content/uploads/2012/06/martin-county-fiber.pdf (June 2012).
[14] *Id.*
[15] *Id.*
[16] ILSR Fact Sheet.

per connection."[17] Further, investment in fiber for schools and libraries can also drive community-wide investments. As the National Broadband Plan notes, "once community anchors are connected to gigabit speeds, it would presumably become less expensive and more practical to get the same speeds to homes."[18]

To achieve greater dark and lit fiber infrastructure investment, the Commission should, from a programmatic standpoint, ensure that resources are available to actually support the investment. This begins with an adequately funded program. Currently, requests for services deplete the entirety of the Fund, leaving infrastructure costs essentially unfunded.[19] We therefore agree with Cisco that the Commission should conduct an immediate "inquiry into the services and equipment that need to be funded, and a candid assessment of the costs to deploy those services and equipment in the nation's schools over a reasonable time horizon."[20] The Commission can then make an evidence- and need-based assessment to determine what a reasonable funding amount might be for the Fund, rather than rely on incremental, static, and minor increases that do not even keep up with the cost of inflation. In addition, the State E-rate Coordinators Alliance (SECA) proposal notes that a simple "Demand versus Availability of Funds" analysis over the last 15 years of the program would be insufficient because "experienced applicants understand the futility of applying for Priority 2 funding unless they have a relatively high discount."[21] Thus the Commission will need to examine the record carefully in this

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[17] Fiber to the X: The Economics of Last-Mile Fiber, http://arstechnica.com/tech-policy/2010/03/fiber-its-not-all-created-equal/, Mar. 31, 2010.
[18] National Broadband Plan Recommendation 4.
[19] Cisco White Paper p. 5; Letter from Mel Blackwell, Vice President, USAC, to Julie Veach, Chief, Wireline Competition Bureau (April 22, 2013) (2013 USAC Demand Letter).
[20] Cisco White Paper p. 5.
[21] Recommendations for E-rate Reform 2.0, State E-rate Coordinators Alliance, p. 31, https://connect.alsde.edu/sites/eia/erate/aeblog/Supporting%20Blog%20Files/SECA%20E-rate%20Reform%202%200%20WP%206-18-2013.pdf (June 18, 2013) (SECA White Paper).

proceeding and may need to do additional analysis. Nonetheless, it is abundantly clear that the program as structured is underfunded to a crippling degree.

The Commission's rules should also ensure that dark and lit fiber are treated equitably under the rules. The Commission proposes to "make [its] treatment of lit and dark fiber more consistent."[22] We agree with the Commission that more parity here is needed and support its recommendation to include support for modulating electronics for dark fiber as well as special construction costs.[23] Decisions about how and under what circumstances fiber buildouts should occur are best made at the local level. Equalizing the treatment of lit and dark fiber gives schools and libraries greater options in how infrastructure will be deployed, and allows communities that wish to self-provision to have the option of amortizing the construction costs of dark fiber over the course of several years, as they currently do with lit fiber investments.[24]

Finally, even with the full range of options available for infrastructure investment *to* schools and libraries, E-rate recipients still need flexibility to implement connectivity *within* and around the institutions themselves. Commenters wish to review the record further to determine specifically how a reworking of the Commission's priority system might improve coverage for internal connections such as switches and wireless routers (as any changes to the prioritization structure will necessarily affect the economics of the Fund itself), but they note that the most efficient use of E-rate funds will depend on a school or library's ability to distribute connectivity

[22] E-rate NRPM ¶ 71.
[23] *see* E-rate NPRM ¶¶ 71 – 72.
[24] The Brooklyn Order, however, requires that upfront or non-recurring costs of $500,000 or more to be amortized over at least three years. *Request for Review by Brooklyn Public LIbrary, Federal-State Joint Board on Universal Service, Changes to the Board of Directors of the National Exchange Carrier Association, Inc.*, File No. SLD-149423, CC Docket Nos. 96-45, 97-21, Order 15 FCC Rcd 18598, para 20.

effectively in and around building walls.[25] Improving access to hardware like wireless routers could also allow the communities surrounding schools and libraries to better utilize available connectivity. The need for improved community connectivity is discussed *supra* in Section II.

B. The Commission should implement minimum service standards to discourage schools and libraries from entering into contracts for broadband service deployed over outdated technologies and encourage them to seek not just the cheapest service, but one that will meet their connectivity needs going forward.

The Commission should implement policies within the E-rate program that create the greatest efficiencies over time. The Commission asks for comment on "what performance measure or measures [it] should adopt to support our proposed goal of ensuring eligible schools and libraries have affordable access to high-capacity broadband at speeds that will support digital learning," and "how best to perform the relevant measurements."[26]

The ultimate goal of E-rate reforms should not be merely aspirational. Performance measures, if defined only in an aspirational context, will be insufficient in ensuring that actual investments—either through self-provisioning by schools, libraries and surrounding communities, or through private investments in additional fiber deployments—actually occur. Faced with a choice between a lower cost broadband subscription service delivered over copper, and a more expensive option delivered over fiber (or investment in fiber infrastructure), schools and libraries currently have no regulatory incentive to choose the latter, even if by doing so, the latter could provide cost-savings going forward or meet looming future needs without significant reinvestment costs.

[25] Though we note that others, including SECA, have also highlighted the need to better facilitate support for hardware, including routers (SECA White Paper p. 8).
[26] E-rate NPRM ¶ 20.

While some flexibility will be necessary to accommodate variances in geography, demographics, and to some extent actual need, the Commission's priority in advancing the stated goals for E-rate program reform should be in facilitating greater fiber infrastructure investment to schools and libraries. To do so, the Commission should implement actual performance requirements, subject to necessary exceptions. These requirements may be phased in as appropriate, but they should be implemented in such a way that ensures that future investments are driven primarily at fiber infrastructure. In other words, the requirements should ensure that momentum is toward steady increases in capacity after each requirement is reached, and that stagnation does not occur. As noted above, this type of dynamic and ongoing growth is captured most effectively in fiber, which is by nature scalable and resilient. Commenters believe it prudent to review the record before recommending firm requirements, but they note that requirements should not just include standards for capacity, but also related concerns that affect network performance such as those related to reliability and stability. Codifying the performance objectives in the form of actual requirements will not only increase investments over time, it will also give schools and libraries leverage on an individual basis to contract for improved service, as well as a specific requirement to turn to in the case of underperforming service.

III. The E-rate Fund should facilitate greater community connectivity where feasible.

Schools and libraries serve an integral role within communities throughout the country, not just for students and families but for all community members. These institutions are anchors in their neighborhoods and, especially for areas with the highest need, are a central point for disseminating much needed resources. In a recent national survey, public libraries offered 3.75

million programs to the public.[27] And while we think of public schools primarily as institutions to educate children, they are also central locations for services that support the parents and guardians of those children, enabling families to provide stable homes and give more attention to their children's academic and social needs. The Commission recognize that schools and libraries, by design, are supposed to be resources for their surrounding communities. They are important hubs for supporting and creating connected communities.

For example, Miami-Dade County Public Schools serve over 340,000 students, with just over 70 percent eligible for free and reduced lunch services.[28] Recognizing that the communities within the district have wide disparities in access, the district authorized a digital convergence plan to connect not only schools, but also the surrounding community. Superintendent Alberto R. Carvalho said of the plan, it "will eliminate our community's digital deserts through content, device empowerment, and ubiquitous wireless access."[29] This initiative, supported through E-rate funds, seeks to lead the nation in universal access for students, teachers, schools, and communities.

To help schools, districts, and states meet these ambitious goals, the Commission should not impose barriers for public institutions seeking to support their communities. Rather, it must keep in mind the values central to these institutions and allow schools and libraries the flexibility needed to promote inclusivity and universal access. Schools and libraries serve as anchors for their surrounding neighborhoods, and E-rate funding should facilitate connected communities

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[27] Growing Young Minds: How Museums and Libraries Create Lifelong Learners, Institute for Museum and Library Services, http://www.imls.gov/assets/1/AssetManager/GrowingYoungMinds.pdf (June 2013) (IMLS White Paper).
[28] Federal Education Budget Project Database, http://febp.newamerica.net/k12/FL/1200390.
[29] Media Advisory, Miami-Dade County Public Schools, http://news.dadeschools.net/releases/rls13/147_digital.html (June 20, 2013).

which will give students, teachers, and consumers access to jobs, lifelong learning, and information.

Thus, the Commission should ensure that schools are not precluded from opening up wireless hotspots to better serve the needs of students, their families, and communities both after school hours, and during school hours where appropriate. Sound policies would also allow libraries to incorporate wireless hotspots into their network design, underscored with the same principle of flexibility and recipient-choice.

A. The Commission should provide flexibility for schools and libraries to maintain open Wi-Fi hotspots during non-school and non-business hours.

The Commission seeks comment on "[...] permitting students and the general public to receive E-rate funded Internet access off-site through wireless hotspots."[30] In the past, the Commission has allowed schools to open their facilities to the community when classes are not in session, providing broadband access to the public on school premises. Several school districts have sought to further promote inclusivity by providing wireless hotspots for the communities surrounding their schools.

The Commission has recognized "the potential value to students and the broader community of having access to broadband services off-premises,"[31] and that potential value furthers the educational purposes standard. As a recent report from the Institute of Museum and Library Services highlights, libraries are providing more rich, accessible digital media—such as educational applications, videos, and audio- and e-books—than ever before. For example, the Idaho Commission for Libraries (ICfL) recently launched an initiative to increase reading

[30] E-rate NRPM ¶ 320.
[31] E-rate ¶ 321.

readiness for children, including a web-based Virtual Story Time that provides access to e-books, activities, and other resources in English and Spanish. Providing the wider community with wireless connectivity off-premises would expand access to the plethora of emerging educational materials available online, building learning opportunities that continue outside the premises of schools and libraries.[32] Cisco builds on this idea, noting that "Wi-Fi enabled areas could be used for continuing education participants, online job applications, or even job interviews using video," and that "[t]his capability would allow the school to open its doors to community participants who have wireless devices but are in need of wireless Internet service."[33]

Further, during the summer months when schools are not in session, maintaining connectivity for community use can serve an extremely important educational role: combating the effects of "summer slide." The National Summer Learning Association (NSLA) and many others point out that on average, students lose about "two months of grade level equivalency in mathematical computation skills over the summer months. Low-income students also lose more than two months in reading achievement, despite the fact that their middle-class peers make slight gains."[34] More than half of the gap between higher-income and low-income students is explained by the limited summer-learning opportunities to which low-income students have access. Maintaining open school connectivity throughout the summer months would provide one additional opportunity for students and families to connect to rich, online resources that will help combat summer learning-loss.

The Commission also asks whether there are "programmatic changes we should make to ensure applicants are able to deploy such wireless hotspots," and whether it needs "to further

[32] IMLS White Paper p. 9.
[33] Cisco White Paper p. 32.
[34] Fact Sheet, National Summer Learning Association, http://www.summerlearning.org/?page=know_the_facts.

revise the educational purposes standard if we permit off-premises access for community use."[35] Given the educational value that is realized through efforts to connect the community more broadly, allowing schools and libraries to implement wireless community hotspots should not run afoul of the educational purposes standard. The Commission need only read the standard in a way that recognizes the aforementioned value and the need for education to extend beyond institutional walls.

Moreover, implementing wireless hotspots is an accessible task for those schools and libraries who wish to do so, particularly if the Fund is already modified to more broadly support internal network connections. More than 90 percent of US libraries currently use wireless routers to provide no-cost Wi-Fi to patrons in the community,[36] and many schools have wireless networks already in place for students and faculty, so expanding the wireless network beyond institutional walls is largely a matter of scale.

Security is also a legitimate concern, but one that can be mitigated with appropriate network architecture. As Cisco notes, "a valid concern by schools is that while the school network is secure from the outside, this opens up the school network to unaffiliated guest users who access the school network from the inside." It adds that "[t]his service requires a sound, secure network infrastructure where community guest wireless access is provided separately and securely over the same equipment, with access only to the outside Internet and not to any local school resources. Designated devices such as such as printers could be provided with the same access for these guests."[37] Therefore, challenges related to security in the context of wireless hotspots differ little from those seen in the context of the provision of connectivity for schools

[35] E-rate NPRM ¶ 321.
[36] Gigabit Libraries Network, http://giglibraries.net/Default.aspx?pageId=1628969.
[37] Cisco White Paper p. 32.

and libraries more generally, particularly when those institutions already provide wireless access for employees, students, and patrons.

B. Additionally, the Commission should provide flexibility for schools and libraries to maintain open Wi-Fi hotspots during school or business hours, when they can demonstrate that doing so will not disrupt service to school students or library patrons.

The Commission asks whether it should include rules to limit use of wireless hotspots to non-school hours, as it had in its 2010 Order with regard to community use of schools' E-rate supported services.[38] It further asks, "[a]re there reasons to preclude access to the wireless service during school hours?" and "[w]ould permitting such wireless access to the community during school hours be detrimental to the operations of the school?"[39]

Wireless hotspots differ significantly from the community uses contemplated in the previous Order. Opening up an existing wireless connection requires fewer resources than maintaining a dedicated "computer lab" space after hours, for example. While a situation could be imagined where opening up a wireless hotspot access point during school hours might interfere with the capacity needs of school and library employees, students or other patrons, it is highly unlikely that a school would have any interest in perpetuating such a disruption. Schools have an inherent interest in protecting the capacity needs of their institutions.

Given that these incentives exist without any regulatory oversight, additional rules from the Commission to restrict access to wireless hotspots at certain times of the day are unnecessary. In addition, they simply would not reflect the realities of wireless access or the nuances of needs and availability of the service and could unnecessarily hinder a school's ability to offer

[38] *Schools and Libraries Sixth Report and Order*, 25 FCC Rcd at 18773-77, paras. 20-27; *Schools and Libraries Universal Support Mechanism*, CC Docket No. 02-6, Order and Notice of Proposed Rulemaking, 25 FCC Rcd 1740 (2010).
[39] E-rate NRPM ¶323.

connectivity to parents, students, and other community members in a way that makes most sense for the institution. A hard distinction between "school hours" and "non school hours" does not necessarily exist, and many situations might exist where school may technically be "in session," but where Internet capacity might not be fully utilized—for example, during all-school events, summer months when school is in limited session, professional development days for teachers, or parent-teacher conferences. Imposing further restrictions based on a determination of what counts as in-session or not could create unintended consequences where, for example, a parent could not access a guest wireless network in a school while waiting for a meeting with the child's teacher.

Therefore, the Commission's E-rate rules should afford maximum flexibility to schools with regard to when, and under what circumstances, they can make wireless hotspots available. This flexibility will allow schools to tailor the use of wireless hotspots to meet the needs of both the community and the institutions themselves.

C. The Commission should also allow libraries to maintain wireless hotspots to serve community and patron needs.

In addition, the Commission should ensure that libraries have the ability to implement wireless hotspots like their school counterparts. Like schools, libraries serve broad community needs that extend beyond the front door. Allowing libraries, in addition to schools, to maintain open wireless networks beyond the often limited hours that they are able to remain physically open to the public would facilitate community access to Internet resources (and perhaps also to *intranet* type services as well, such as access to online library catalogues and other digital resources). As with schools, we believe that libraries should be afforded great leeway in

determining how and under what circumstances they will make the hotspots available to the public.

Numerous examples of the benefits of open library connectivity exists, including a survey from Pew Research Center's Internet & American Life Project that found, astoundingly, that "77% of all those ages 16 and older said it was very important for libraries to offer free access to computers and the internet to the community and another 18% said it was somewhat important. Just 2% said it was not too important and another 2% said it was not important at all."[40] These sentiments rang particularly true for African Americans and Latinos, who have historically been on the wrong side of the digital divide.

In addition to a demonstrated need for wireless connectivity at libraries, there has also recently been a surge of wireless innovation building and amplifying connectivity in libraries. The Gigabit Library Network has introduced an initiative to use "Super Wi-Fi", a technology deployed using unlicensed TV-Whitespace (TVWS) spectrum, to push connectivity into communities beyond what is traditionally achieved through "normal" Wi-Fi. The technology is being deployed through a pilot program that will "demonstrate how integrating these two wireless communication technologies can benefit library users by combining the new universal compatibility of Wi-Fi with the range and penetrating capabilities of TVWS equipment."[41] This initiative demonstrates the ways in which libraries are innovating in the context of wireless delivery and could portend new, surprising uses of existing connectivity in the future. Unnecessary restrictions within the E-rate program could stifle these innovations.

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[40] Internet Access at Libraries, Pew Internet and America Life Project, http://libraries.pewinternet.org/2012/12/28/internet-access-at-libraries/ (Dec. 28, 2012) (emphasis in original).

[41] Gigabit Libraries Network Announces Results of First National Super Wi-Fi Pilot, Mobility Tech Zone, http://www.mobilitytechzone.com/topics/newsfeed/articles/351430-gigabit-libraries-network-announces-results-first-national-super.htm (Aug. 20, 2013).

IV. The Commission should implement smart data collection practices to improve the efficacy of the Fund and promote greater transparency over broadband availability and quality for schools and libraries.

The Commission seeks comment, "on ways to collect, manage and share data to track...progress in meeting [program] goals."[42] As the Commission notes, data collected can serve as a powerful tool, informing performance measures to track goals, evaluate program quality, and drive improvement. Not all data, however, are created equal. Better data collection will not only reduce reporting burdens on schools and libraries but also produce more usable data sets for evaluation by both the Commission and independent researchers. Thinking through both the data points that need to be collected, as well as their format and compatibility, is critical to ensure that the data collected can be used to accurately measure progress, ultimately leading to sound program evaluation.

To effectively evaluate E-rate's progress toward program goals, data collected from both schools and providers must be meaningful, robust, and usable. Therefore, the Commission should ensure that required forms and documentation yield relevant and robust data; assess and collect actual connectivity in schools and libraries; annually make data available in machine-readable format; and optimize data collection to correspond with other important data sources. As part of the push for better data, service providers should also be required report useful information that can be combined with the data provided by schools.

[42] E-rate NPRM ¶ 15.

A. The Commission should ensure that from the start, required documentation - such as the Form 471 filings - collects useful data.

The Commission seeks "comment on how best to collect data on the speed and quality of school and library connections."[43] Currently, information on speed and price is collected from schools and libraries through a number of different forms in the E-rate application. In Form 470, Block 2 requests "'Summary Description of Needs or Services Requested' for (8) Telecommunications Services, (9) Internet Access, (10) Internal Connections Other Than Basic Maintenance, and (11) Basic Maintenance of Internal Connections" and includes blank fields for "Service" and "Quantity and/or capacity" requested by schools and libraries.[44] Form 471 asks schools for the number of classrooms connected to the internet in general and for data on "high-speed internet access services"—specifically, the number of buildings served with speeds ranging from 200 Kbps to upwards of 100 Mbps (based on advertised speeds).[45] The Item 21 attachment requires that schools provide a "narrative overview or description" of objective of the funding requestment and additional details, in a non-standardized format.[46]

The Commission should update these forms to collect better and more usable data for comparing the speeds and prices paid by different schools, evaluating the program as a whole, and creating greater accountability for service providers. As a first step, the Commission adjust the forms to provide standard options rather than blank fields in order to harmonize the data collected about school requests for services and capacity. It is also worth considering what data is really necessary to collect from schools and libraries and which requirements, if any, are overly burdensome. After a critical evaluation of the E-rate application forms and how they are

[43] E-rate NPRM ¶ 30.
[44] FCC Form 470, Block 2, http://www.usac.org/_res/documents/sl/pdf/forms/470.pdf.
[45] FCC Form 471, Block 2 Part 7g, http://www.usac.org/_res/documents/sl/pdf/forms/471_fy05.pdf.
[46] FCC Form 471, Item 21 attachment, http://www.usac.org/sl/applicants/step04/item-21.aspx.

used, the Commission should create a simpler, more streamlined request which would simplify the application process for schools and lessen the requirements of program administration, while collecting a more targeted and better set of data about the program.

Similarly, the burden of reporting speed and price data should be more balanced between schools and libraries and the service providers. After requests for competitive service bids are submitted and a particular school or library selects a service provider, the Commission could require that the service provider report on the price of service, overall capacity provided to each school or library, and additional granular data that would assist in evaluating the program's effectiveness. The data currently collected on Form 471 details advertised speeds to each building—data which service providers could report just as easily as schools and libraries, thereby removing some reporting burdens from schools and libraries. Additionally, the Commission could require that service providers report on the last mile technology used to connect schools and libraries, which could assist the Commission in determining whether and how much support for upgrading to higher capacity infrastructure is needed.

Alleviating some of the reporting burdens on schools and libraries by shifting them to the providers would make it possible for schools to better provide the Commission with standardized data about the purpose(s) of the services they are requesting. The current open-ended nature of the form fields and the "narrative overview or description" of objectives for the funding makes it challenging to analyze the variety of technology initiatives that schools and libraries may plan to implement once they have obtained sufficient connectivity. Creating more general categories, or buckets, for institutions to choose from will allow the Commission to better understand how students, library patrons, and other users are benefitting from increased connectivity supported by the E-rate program. These categories should assess the services and programs institutions are

trying to provide: for example, are schools and libraries providing connectivity for laptop carts? Computer workstations? Facilitating Bring-Your-Own-Device (BYOD) and 1:1 technology initiatives? These fields can be supplemented with additional space for schools to provide additional detail or explain special circumstances in a narrative manner. One of the missing links to understanding how connectivity impacts student learning is better knowledge about the end-user products schools and libraries are using and what kind of innovative programs they intend to implement.

B. The Commission should seek to robustly assess actual school and library connectivity, to both understand user needs and ensure quality service.

While E-rate funding data is available at the consortia and district level, along with data on the advertised speeds provided to schools and libraries, understanding what actual connectivity is on a school/classroom level is also critical to program evaluation. A recent report from the office of Scott Stringer, Manhattan Borough President, on the state of connectivity in New York City's public schools and libraries demonstrates the necessity of this information for a more nuanced assessment. An aggregate comparison of the data from April 2011 and July 2013 about the maximum Internet speeds at 1,236 education institutions in New York City shows that speeds are increasing on the whole. However, a closer look reveals that 75 percent of those schools still rely on connections of up to 10 Mbps or less—hardly sufficient to support future, let alone current, broadband capacity needs.[47] The variation among different schools in an urban, densely populated city, makes a powerful statement about the challenges that schools across the country are facing today. Moreover, the data provided by the New York City Department of

[47] New York City's Digital Deficit, Office of the Manhattan Borough President, http://www.scribd.com/doc/161686382/Scott-Stringer-Digital-Deficit-Report (August 2013) (New York City White Paper).

Education details the maximum speed advertised by the provider, and so in reality those connections are probably even slower, especially during peak usage times.

Broadly, there is value in developing a set of standard metrics for nationwide measurement of network performance which could be used to evaluate and track improvement of school networks over time. Actual speed data could also be compared to aggregate data reported by service providers about price and speed to identify the gap between the advertised and actual performance of the network. Actual performance data would also be useful for individual schools and libraries to evaluate their own connections and to ensure that they are receiving the level of service promised in their contracts. The Commission asks, "…should we require some or all E-rate applicants to have dedicated equipment measuring performance to and within each of their buildings?"[48] There is a clear need for automated tools that allow schools to collect network performance data at the premise, which would yield more data without increasing the burden on schools by requiring them to perform speed tests at various times and record that information.

Tools to measure Internet performance already exist, including one called BISMark that runs over Measurement Lab (M-Lab), an open, distributed server platform on which researchers can deploy open source Internet measurement tools. BISMark allows users "to measure Internet performance continuously over time."[49] Specifically, "[u]nlike the many existing tools that run from a user's computer, BISMark runs on a user's home router itself."[50] Thus, "BISMark can not only measure Internet performance continuously over time, but also help differentiate any performance problems caused by a user's ISP from those caused by a user's home network

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[48] E-Rate NPRM ¶ 34.
[49] Measurement Lab Introduces New, Hardware-Based Tool, Google Public Policy Blog, http://googlepublicpolicy.blogspot.com/2011/07/measurement-lab-introduces-new-hardware.html (July 19, 2011).
[50] *Id.*

setup."[51] While BISMark is not presently scalable to a level that would allow it to be readily deployed at this time, researchers are currently investigating its use in the context of premise-level, automated monitoring at community anchor institutions. The Commission should continue to investigate this tool and others and assess their feasibility to provide an independent data set to which the data reported by schools, libraries, and providers can be compared.

The Commission further asks, "Should we make the collected information available to the public?"[52] The results of these speed tests and other performance measures, if conducted, should be made publicly available so that they can be incorporated into other E-rate data sets and used by both the Commission and independent researchers for evaluation. As Cisco explained, "This will allow sufficient tracking of the progress toward bandwidth target goals while allowing schools and districts to make network architecture and design decisions on how to best implement the target goals based on their requirements and local and regional opportunities."[53] Indeed, as a rule, "[a]ll data collected via M-Lab is made available to the public, allowing researchers and anyone else to build on a common pool of network measurement data."[54]

C. The Commission should commit to making data collected through the E-rate program readily available to schools, libraries, researchers, and the public to help facilitate understanding of where problems and inconsistencies within the program exist.

Along with better data about the services provided through E-rate, this information should be made available to promote accountability among schools, libraries, and service providers. The Commission asks for comment on "whether we should direct USAC [Universal Service Administrative Company] to permit public access to FCC Form 471, Item 21

[51] *Id.*
[52] E-rate NPRM ¶ 34.
[53] Cisco White Paper p. 26.
[54] http://www.measurementlab.net/about.

information or any other information provided by either applicants or service providers participating in the E-rate program."[55] More data would lead to greater transparency overall, making it possible for schools and libraries to self-assess whether they are receiving the services they requested at the appropriate price and make it easier to identify situations where the Lowest Corresponding Price rule (or other similar mechanisms) needs to be enforced.

In a speech about E-rate reform in July 2013, Commissioner Pai placed a heavy emphasis on the importance of increased transparency in the E-rate program. He noted that we need "an easily accessible online resource so that the public can see in detail how much E-rate funding is available to a school and how each school is spending its E-rate funds."[56] We agree that transparency is key to improving the overall efficiency of the program, although we would not restrict the requirements to schools and libraries—data from service providers, too, should be made available to promote accountability and to curb waste, fraud, and abuse.

If such information were made available, schools and libraries would be able to compare the speeds and prices reported by the service providers to the bills they receive and the actual speeds measured over the network. This information would enable schools to make informed decisions about the amount of bandwidth they need to purchase in order to meet their capacity needs. In cases where there appears to be an exceptionally large gap between the advertised and reported speeds, schools could use this data to find out if providers are meeting their contract obligations and to hold them accountable if not. Armed with data, schools and libraries could more easily self-assess whether they are receiving the services that they requested. This, in turn, would improve quality and help curb waste, fraud, and abuse in the program as a whole.

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[55] E-rate NPRM ¶ 196.

[56] Comments of Ajit Pai, Federal Communications Commission, http://www.aei.org/files/2013/07/22/-connecting-the-american-classroom-transcript_092647280283.pdf (July 16, 2013) (Pai Remarks).

Similarly, better data would also make it possible to enforce existing mechanisms that are intended to increase efficiency in the E-rate program, such as the Lowest Corresponding Price Rule.

Greater transparency can give schools, libraries, and their communities greater agency to be involved in oversight of the E-rate program. As Commissioner Pai correctly emphasized in July, "With transparent decisions, the whole community can be involved in effective oversight.[57] However, we maintain that in order to participate in this oversight, members of the community need access to sufficient data from not only the schools and libraries but also the service providers in order to identify gaps in service and understand how funding is being spent.

D. The Commission should annually release complete E-rate data in machine-readable format, building upon the data it has made available in the past.

A key component of greater transparency in the E-rate program is regular, timely releases of E-rate data in a usable format. In October 2012, the Commission released the complete E-rate records from Funding Year 2010 in machine readable format.[58] In the release, the Commission stressed that it was eager to "see what others can do with this data, and to understand what additional data we need to gather and publish to help answer important questions about the impact of the E-rate program."[59] The available data offers valuable insight into the types of service requests being made by schools and libraries and the prices they pay. However, the data provided by the Commission also has limitations, particularly because the multitude of different possible responses makes it difficult to do meaningful analysis on the data to draw out trends.

[57] Pai Remarks
[58] FCC Releases Machine Readable Data on E-rate Program, FCC Official Blog, http://www.fcc.gov/blog/fcc-releases-machine-readable-data-e-rate-program (Oct. 19, 2012).
[59] *Id.*

Ensuring that the forms yield better, simpler data—which can be achieved at least in part by providing schools with standardized options and categories to describe service requests rather than blank fields—will greatly facilitate data analysis by the Commission as well as independent researchers.

Releasing this data in machine-readable format on an annual basis is also critical for measuring the program's progress over time. One way to facilitate data collection and release of usable information would be to streamline the receipt of information through a unified online application or portal. As SECA recommends, such a system would ease the burden on schools when filling out E-rate applications each year and improve the efficiency of program administration overall.[60] Moreover, the information provided via the online portal could be more easily converted into a publicly searchable database for research and analysis purposes. This could help the Commission understand whether the program is meeting its goals and how the needs of schools and libraries evolve over time.

E. The Commission should optimize FCC data collection and reporting requirements to correspond with other robust data sources, such as those available through the National Center for Education Statistics (NCES).

The Commission asks, "Will making [...] data public encourage the public to develop new and innovative methods to analyze E-rate data?"[61] In addition to making E-rate data more publicly available, we see potential for gathering data to support research that crosses between the education and technology fields. Innovative analysis will be possible if data is optimized so that it corresponds to other educational data sources.

[60] SECA White Paper p. 17.
[61] E-rate NPRM ¶52.

Specifically, utilizing common identifiers for entities such as individual schools and districts will allow researchers and the public to combine multiple data sources for more robust and innovative analysis of the E-rate program. For example, NCES maintains the Elementary/Secondary Education System (ELSi) database.[62] ELSi provides school and district level data on enrollment, grade-span information, demographic information, pupil/teacher ratios and more. Using these additional data points would provide a greater understanding of the schools and districts where E-rate funding is deployed. Currently, however, it is exceedingly difficult to match up these disparate data sources.

The most efficient method to ensure these data correspond is to utilize a common, unique identifier for each entity analyzed. Fortunately, NCES maintains unique identifiers for the majority of education institutions that receive E-rate funds. Further, the Institute of Museum and Library Sciences (IMLS) maintains identifiers for public libraries as well. Working with both NCES and IMLS, the Commission should adopt unique identifiers for entities that are tracked commonly, and develop additional identifiers for entities that are not already tracked (such as School and Library Consortia [SLC] that receive E-rate funding).

Making data publicly available in a manner that corresponds with other data sources is critical to promoting new and innovative analysis. Use of unique identifiers is an effective and efficient method for enabling the public to combine multiple data sources for more robust analysis.

[62] National Center for Education Statistics, Elementary/Secondary Elementary System, http://nces.ed.gov/ccd/elsi/.

V. E-rate funds should be distributed in a way that promotes fair and equitable service and speed for students and patrons of all schools and libraries.

The Commission has asked for comment on several areas that directly affect the equity of service and speeds to schools and libraries throughout the country. Chief amongst these are proposed policies relating to new funding structures and educational impact measures, as well as existing policies about eligible school facilities. As the Commission seeks to modernize the E-rate program, addressing these diverse issues collectively will go a long way to making the program more equitable for all schools and libraries.

First, while considering alternative funding structures for the E-rate program, the Commission should critically consider how per-pupil—or other fixed-rate—funding allocations would affect the flexibility of the program in addressing the diverse infrastructure and service needs of different institutions. Further, to better understand the educational impact of E-rate funding, the Commission should gather data to measure whether funds are, in fact, contributing to the creation of more robust learning environments, as opposed to using test-score data to determine the E-rate Fund's effectiveness. Finally, the Commission should seek ways to increase parity in service to primary and secondary institutions to ensure that regardless of the state in which a student lives, that student receives equal access to high-speed service and connectivity. Addressing these three policies in a cohesive manner will promote greater program equity for students of all ages, in communities of all sizes, throughout the country.

A. The Commission should critically consider the impact per-pupil funding would have on achieving broadband infrastructure parity, as well as equitable service and speed.

While the Commission has acknowledged that a fixed allocation of E-rate funds to all schools, for instance adoption of a per-pupil allocation system,[63] may simplify some aspects of program administration, it may also introduce greater inequality. While the current program administration is quite burdensome, it does accommodate for the widely variant needs of each applicant, or group of applicants. As the Commission strives to promote affordable access to 21st century broadband service for all schools and libraries, it should critically consider how moving to a fixed distribution of funds allocated on a per-pupil basis may undermine this goal.

For example, one of the greatest barriers to fair and equitable service and speed is the current lack of infrastructure and hardware in schools and libraries. Some of these costs are fixed and may not correspond directly to the number of students. Rialto Unified School District in Rialto, California serves as a clear example of this issue. The suburban district, located on the outskirts of Los Angeles, serves over 23,000 students. Eighty-three percent of those students qualify for free and reduced price lunch. For each of the 14 schools for which they applied for support for internal connections, which range in enrollment from 551 to 1142 students, they have two different E-rate disbursements. The first, paid to Cybertek Computer and Networking services, is a fixed cost of $7,834.39 for each school in the district. The second, paid to MTM Technologies California Inc., is a variable cost that ranges from slightly more than $100,000 to over $200,000 depending on the school. These variable costs still do not correlate directly with the number of students; the per-pupil cost varies from approximately $145 to $245.[64]

[63] E-rate NPRM ¶ 149-151.
[64] According to data from E-rate and FEBP database.

This example reflects the different costs for a group of schools located within the same district, using the same two providers to purchase similar services. Within the current funding structure, the district was able to get sufficient support for connectivity for all of its schools. Distributing funds to each of these schools on a per-pupil basis would not have adequately met most of their needs. Further, the requests from Rialto differed dramatically from the needs of the urban Los Angeles or rural Ducor Union, two nearby districts that both also received E-rate funds. As SECA emphasized, "The costs of E-rate eligible services, especially bandwidth for Internet, vary greatly from one location to another and from one provider to another. In other words, the same 100 mbps circuit may cost $4,500 per month in one location whereas it may only cost $300 mbps in another location." SECA concluded that, "A block grant, per student or per location allocation does not take this variation in account sufficiently."[65]

Even within New York City, one of the most densely populated cities in the United States, variability suggests that a per-pupil allocation could lead to greater inequity. While the city has invested $738 million in capital funds "to equip hundreds of school buildings with essential broadband infrastructure," the Manhattan Borough President's report demonstrates that there is still great variability in speeds and services available in city, even at schools and libraries located in close proximity to one another. For example, one library in West Harlem reported download speeds of 0.66 Mbps, while another library in Central Harlem—just one community district away—had a 94.02 Mbps connection.[66] The report concluded "the high speed Internet gap in the New York City public school system is pervasive and the likelihood of finding a fast or slow Internet speed in a Manhattan library is seemingly random." While a number of factors may account for the variability in speed, it is clear that a one-size-fits-all solution would likely not

[65] SECA White Paper p. 2.
[66] New York City White Paper p. 2.

help create an even playing field across a highly-developed area like New York City, let alone in rural areas of the country.

B. While the Commission should continue to collect robust data, it should explicitly prohibit proposals that tie funding to specific education outcomes.

When considering the value of using educational impact measurements in determining the E-rate program's cost-effectiveness, the Commission raises an important point in asking, "Is there a way to measure how success in the classroom is affected by access to E-rate funding or services supported by E-rate?"[67] We commend the Commission for looking for ways to measure success, but we recommend that in building a case for the importance of connectivity in schools and libraries, a sounder approach would be to gather data on how well the E-rate program contributes to the *environments* that foster learning, rather than looking for a direct relationship between connectivity and educational outcomes.

There is a multitude of issues presented when considering using educational impact measures to determine the E-rate program's cost-effectiveness. Schools do have many measures of classroom success, the most common of which are student test scores. While educational outcomes such as test scores are measurable, it would be inappropriate to infer causality between E-rate funding and test scores. The Commission is correct in acknowledging that there are many factors that affect classroom performance. Strictly speaking, however, access to E-rate funding or services supported by E-rate have no greater impact on student's test performance than do a school's electrical outlets or the reliability of electricity. E-rate funding supports infrastructure and communications services, which are integral to the learning environment but do not directly impact educational outcomes. Digital learning environments are built utilizing broadband access,

[67] E-rate NPRM ¶ 40.

but require end-user tools—such as laptops, tablets, and e-readers—equipped with effective learning software and resources like e-books, interactive games, and assessment tools in order to foster real student success in the classroom.

It would be incredibly beneficial for the Commission, through improved data collection, to gain a better understanding of the types of resources both schools and libraries make available to students, families, and communities given E-rate funding. Given 21st century connectivity, it is important to determine whether schools and libraries are investing in 21st century tools. However, tying E-rate funding for specific institutions to those resources and the relative success or challenges they create would be an inappropriate use of the data.

C. The Commission should investigate ways to improve parity in primary and secondary education nationwide to ensure that all students of all ages in public schools have equitable access to connectivity.

Currently, E-rate funding is distributed to schools within each state based upon that state's definition of primary and secondary education. As a result, access to E-rate funds varies from state to state in career and technical education, in juvenile justice systems, in Head Start centers and even in pre-kindergarten classrooms based in public schools.[68] Relying on state definitions has created an environment where students across different states are treated unequally.

This inequality has become increasingly visible in the example of pre-K.[69] Nationally, access to early childhood education has been recognized as imperative to addressing student

[68] For a sense of the variability of eligibility by state, see the Universal Service Administrative Company's eligibility table for non-traditional education: http://www.usac.org/sl/applicants/beforeyoubegin/non-traditional/eligibility-table.aspx;
[69] "Technology in Early Education: Building Platforms for Connections and Content that

achievement. Yet in states such as Alabama and Georgia—which are consistently amongst the highest-ranked states for the exemplary quality of their pre-K programs—pre-K classrooms are not eligible for E-rate funding. At the same time, pre-K classrooms in the states of California and Florida are eligible for E-rate funding, despite consistently scoring amongst the lowest in terms of pre-K quality.[70] This is not to say that states should only receive funding for pre-K if they have already created high-quality learning environments; rather, it is to say that some states' definitions of education are outdated and do not necessarily reflect those states' more inclusive approaches to education. Connectivity can be just as important in these settings as in traditional K-12 classrooms, as teachers need to gain access to and use information about students' progress and learning goals—information is increasingly housed online. Teachers in pre-K settings, for example, need to be able to gain access to data on their students' needs and to create online portfolios of their achievements. The Commission should seek ways to achieve greater parity in support of primary and secondary education to ensure that they are promoting equal access for students and their teachers regardless of which state in which they happen to live.

Conclusion

Our country's communications infrastructure continues to lag behind our global peers. "Indeed, while other nations—from South Korea and Japan to the United Kingdom and Australia—set ambitious goals for fiber connectivity, the United States remains in the modern equivalent of the Stone Age with limited private sector competition and minimal public

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[69]Strengthen Families and Promote Success in School," *The Progress of Education Reform*, Vol. 13, No. 4 (Denver, CO: Education Commission of the States) August 2012, Available online at: http://www.ecs.org/clearinghouse/01/03/00/10300.pdf

[70] National Institute for Early Education Research (NIEER). The State of Preschool 2012. http://nieer.org/sites/nieer/files/yearbook2012_executivesummary.pdf

investment in the fourth utility of the modern age."[71] As Commenters have illustrated, this disconnect has profound implications for our schools and libraries as well. The Commission must take steps to move into a place of competitiveness, rather than complicity, with regard to our Internet connectivity. Robust investment in fiber infrastructure underscores this goal. Our educational system will continue to suffer if the E-rate program is crippled in its ability to meet the 21st century needs of educators, students, families, and communities. Commenters respectfully ask the Commission to adopt the recommendations set forth above.

[71] New York City White Paper p. 16.